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Vol. 2 September 1954 No. 3

The Cultivated Episcias

Harold E. Moore, Jr.

Few genera of gesneriads deserve their popularity more than the tropical American Episcia. Distinguished by its habit of producing stolons or runners in the fashion of strawberries, it is readily propagated and when given proper care will flourish in the home or greenhouse. A number of recent articles in The Gloxinian, The National Horticultural Magazine, and other magazines of popular gardening have dealt with its culture. The following discussion is an attempt to provide a means of identifying the species and to clarify some confusion in names.

Although numerous species of diverse habit have been placed in the genus, the more recent tendency has been to include in Episcia only a dozen or so known species. These have low herbaceous stems producing stolons at the base, red, white, creamy or lavender tubular flowers with a broad flaring limb and oblong anthers united in a square. They are further distinguished botanically by technical characters of the disk and ovary.

The cultivated species number five: E. cupreata, E. dianthiflora, E. fulgida, E. lilacina and E. punctata. Another species with a stout erect stem is often listed as Episcia tessellata. It is now placed in the genus Nautilocalyx and bears the name Nautilocalyx bullatus. The following key may serve to distinguish the species:

1. Stoutish erect herbs lacking stolons; flowers yellow, the anthers united in pairs by their tips. . . . . Nautilocalyx

1. Low herbs creeping by stolons from the base; flowers red, white, creamy or lavender, the anthers united in a square by their tips and sides. . . . . Episcia

2. Flowers pure white or pale creamy-white spotted with purple or violet, solitary in the leaf-axils on pedicels up to 8 mm. long.

3. Corolla glistening white, the limb unspotted; leaves obtuse, about 4 cm. long. . . . . E. dianthiflora

3. Corolla creamy-white spotted with purple; leaves acute, about 7.5 cm long. . . . . E. punctata

2. Flowers colored, the limb red or lavender, 1-2 or usually 3-4 or more on pedicels 1.8 cm. or more long from a short common peduncle.

4. Limb of the corolla lavender. . . . . E. lilacina

4. Limb of the corolla red.

5. Corolla-tube about 3.5 cm. long, the inside pink with obscure lines but no spots, the outside uniformly red, nearly straight and not or only slightly enlarged below the throat; calyx-lobes generally rather conspicuously toothed at the tip. . . . . E. fulgida

5. Corolla-tube about 2.5 cm. long, the inside yellow with red spots, the outside reddish and rather prominently angled on the upper side, yellowish with red markings and swollen below the throat on the lower side; calyx-lobes generally entire or with inconspicuous teeth. . . . . E. cupreata

Before enumerating the species, some comments on the name Episcia coccinea are required. In a previous article on The Scarlet Episcias, Baileya 1: 46-48 (1953), some reasons for discarding the name were given and it was suggested that it had been used for E. cupreata in the United States. Further experience with living collections indicates that most of the plants so labelled are actually to be referred to E. fulgida instead. Whether the name was intended for E. cupreata or E. fulgida cannot be determined from any information available. It should be discarded on two counts, first that it is a confused or ambiguous name impossible of application as the following summary will show, and second that valid names were already available and in use for both red-flowered Episcias known in horticulture.

Episcia coccinea (B. S. Williams) Bentham and Hooker f. ex Shore and Miller in Bailey, Cyclopedia of American Horticulture 2: 537 (1901) - nomen confusum.

Cyrtodeira coccinea B. S. Williams, in Gardeners' Chronicle, new series, 3: 490 (1875).

In the issue of Gardeners' Chronicle, for April 17, 1875, B. S. Williams advertised a series of new plants ready for distribution in May of that year. Among them was listed Cyrtodeira coccinea with the following brief description: "A very pretty basket plant, producing bright scarlet flowers; leaves dark mettalic green, from 3 to 4 inches long, and 2 1/2 to 3 inches broad. This is a very free flowering species, literally covering the basket in which it is grown with flowers." Williams mentioned no native home for his species nor did he give any of the important details that are required to distinguish between red-flowered Episcias.

No further use of this name has been found in the literature until it was given as a synonym of Episcia coccinea in Bailey's Cyclopedia of American Horticulture where the original description of the advertisement is paraphrased. Here the name Episcia coccinea was attributed to Bentham and Hooker f. although the latter made no specific mention of it in their treatment of Gesneriaceæ for Genera Plantarum. The combination, then, appeared for the first time in the Cyclopedia. In Bailey's Standard Cyclopedia of Horticulture 2: 1125 (1914), Taylor noted that some plants sold as Episcia metallica were probably E. coccinea.

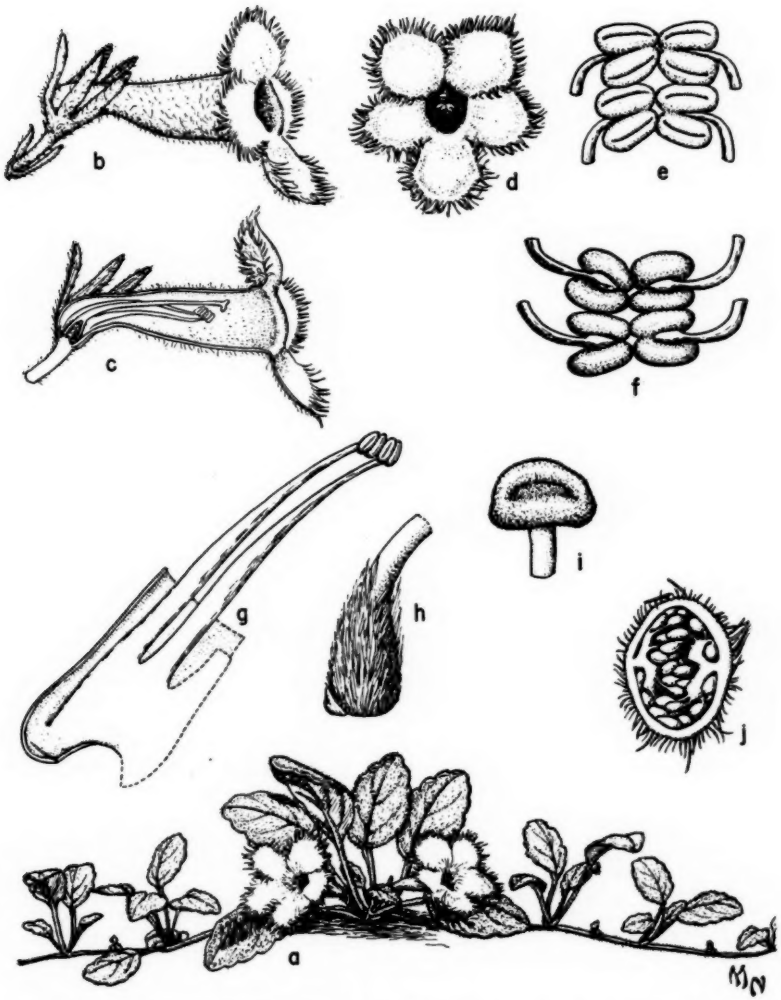

Fig. 25. Episcia dianthiflora. a, habit x 1/2; b, c, d, flower, lateral view, vertical section, and face view x 1; e, f, anthers, ventral and dorsal views x 6; g, insertion of stamens x 3; h, ovary and basal disk gland x 6; i, stigma x 6; j, ovary, cross-section x 10. [Reprinted from Gentes Herbarum 8: 374, 1954.]

Episcia coccinea is similarly attributed to Bentham and Hooker f. in Parey's Blumengartnerei 2: 394 (1932) and Episcia metallica Hort. is listed as a synonym, apparently following Taylor. The very brief description adds nothing to the original.

All the descriptions found have been based on phrases of the advertisement mentioned above. Although one may assume from the date for Episcia coccinea and from the usual association of the name with plants of E. fulgida that they are the same, the description may apply to both E. cupreata and E. fulgida. It is, therefore, not cited as a synonym of either species. Growers having plants under this name may determine which species they have by consulting the key above or Baileya 1: 46 (1953).

Episcia dianthiflora (fig. 25) is a newcomer to the United States. A native of Mexico, it has been grown in some Mexican gardens but had not been known here until very recently, when it was independently introduced into several parts of the country. Its glistening white, deeply fringed flowers are borne singly in the leaf axils on very short pedicels, sometimes scarcely emerging from the cover of leaves. The connoisseur of plants will value Episcia dianthiflora for itself, the breeder will undoubtedly see its possibilities as a parent in hybridization.

Flowers of Episcia punctata are less striking than those of E. dianthiflora, but are noteworthy for their delicate creamy-white, fringed lobes spotted with purple or violet. The stems and leaves are more coarse and the plant tends to be a rank grower with little grace when compared with such species as E. cupreata. It was first introduced to England in 1840 when Theodore Hartweg sent material from Guatemala to the Royal Horticultural Society, then known as the Horticultural Society of London. In recent years it has also been discovered in southern Mexico but is apparently uncommon in the wild. Through error on the part of the writer, Episcia punctata was at one time distributed by Fantastic Gardens, South Miami, Florida, as Drymonia mollis. Other erroneous names sometimes used are Drymonia spectabilis, which in reality belongs to a strikingly different plant, and Isoloma grandiflorum, a name of no botanical standing.

The most familiar species of Episcia are those having colored flowers and handsome foliage. Red-flowered E. cupreata and E. fulgida have been in cultivation for many years. A third species with lilac or lavender flowers, E. lilacina, was grown in Europe as Episcia chontalensis or Cyrtodeira chontalensis as early as 1867 but apparently has not persisted there unless in private collections. Recently new material from Costa Rica and Panama has been sent to the United States. Mr. Jack Reark has described the Costa Rican habitats of two variants in The Gloxinian, May-June, 1952. One kind having dark green leaves with a contrasting herring-bone center of emerald green agrees with plants first described by Han-

stein and botanically would be called Episcia lilacina variety lilacina. The particular plants collected by Mr. Reark in the foothills of the Cordillera de Talamanca were given the fancy name E. lilacina 'Mrs. Fanny Haage' in The Gloxinian, January-February, 1953. The same plant is called E. lilacina 'Variegata' by A. B. Graf in Exotic Plants Illustrated, 2nd Edition, 1954. In this book, Mr. Graf has used the name E. lilacina 'Cuprea' for a second phase mentioned by Reark as having come from the gorge of the Reventazon river. The leaves are coppery green with at best no more than a faint central pattern. A third phase having emerald green leaves silvered in the center may correspond to plants once thought to represent a separate species, E. Fendleriana. To these plants Graf has applied the name E. lilacina 'Viridis'.

When Episcia chontalensis was first described by Berthold Seemann in 1867, he apparently did not realize that his plant from Nicaragua was the same as that described previously from Costa Rica as E. lilacina. The name Episcia chontalensis as it is currently used in the United States, however, applies to a very narrow-leaved form of E. lilacina occurring wild in Panama. Shy-flowering and inclined to produce awkward-looking stolons when grown in a basket, this form may conceivably represent a distinct botanical variety. For horticultural purposes, the name chontalensis should be dropped and these plants may be referred to by a fancy name as E. lilacina 'Panama'.

Neither words nor illustration can do justice to the brilliant flowers and striking foliage of Episcia fulgida when it is well grown. Plants given too little light sometimes have washed-out leaves or when overexposed to light they become burned. Under proper culture, however, the foliage is rich deep green with a striking silvery patterning about the veins. The leaves are large and thick and alone are adequate recompense for care given them. A rare sport sometimes has bright rose-pink blotching but aside from this there appear to be no variants in cultivation. Episcia fulgida is a native of Columbia, as is E. cupreata from which it is easily distinguished by the longer flowers with a slender, unspotted, uniformly red tube as noted in Baileya 1: 46, fig. 36 (1953).

Though last in consideration here, Episcia cupreata was the first species of the genus to be cultivated in Europe where it flowered at the Royal Botanic Garden, Kew, England, in 1847. The original and typical botanical form had embossed coppery green leaves with soft erect hairs, and by the botanist would be designated as Episcia cupreata variety cupreata.

Ten years after the coppery form was described, a phase identical in flower but possessing smooth green leaves with appressed hairs was sent to Belgium from Colombia. To this form Linden gave the name Tapina splendens, a name later changed to Episcia splendens by Hanstein. Sir William Hooker recognized its affinity

with Episcia cupreata and gave it the varietal name viridifolia. We know too little of E. cupreata in the wild to be able to evaluate these varieties on a biological basis, although what little information we have indicates that the species as a whole is variable. In cultivation the varieties are distinct but, to afford a uniform method of horticultural reference, they may be indicated as cultivars 'Cupreata' and 'Viridifolia'.

Sports and hybrids derived from these two varieties have given us a series of interesting clones. Two were recognized in the 1860's. Plants with leaves like those of 'Cupreata' but having a central pale green band margined in metallic pink were given the name 'Metallica' by Regel in a varietal sense. Today this form is still grown, sometimes under the later name 'Kitty'. A variegated form of 'Viridifolia' having a central pattern of silver was called Tapina variegata by Linden. It is apparently the same as material commonly grown as Episcia splendens today. Perhaps having arisen as a mutant of 'Viridifolia' (Episcia splendens) it is not strictly equivalent to it. To avoid confusion it would be preferable to designate the clone as E. cupreata 'Variegata'.

Two recent sports are currently propagated. One, 'Silver Sheen' is a branch mutant of 'Cupreata' having a silvery center and dark margins. The second, 'Harlequin' is a mutant of 'Variegata' with dark-margined leaves. The remaining cultivars are either of unknown origin such as 'Sylvan Beauty' with smooth silvery leaves margined in brown or hybrids apparently derived from a cross between 'Cupreata' and 'Variegata'. Four clones of this character were described by R. G. Wilson in the catalogue of Fantastic Gardens for 1953: 'Acajou' with a broad fern-pattern of silvery green on a dark mahogany background, 'Chocolate Soldier', dark chocolate with a narrow silvery midrib, 'Emerald Queen' with narrow silver midrib and veins and 'Frosty', downy emerald green with wide silver midrib. Similar plants have been experimentally produced by Owen Rogers at Cornell University using 'Cupreata' as one parent, 'Variegata' and 'Viridifolia' as alternate parents.

A summary of names and synonyms is appended here for reference.

1. Episcia dianthiflora H. E. Moore & R. G. Wilson, in Gentes Herbarum 8: 378 (1954).

2. Episcia punctata (Lindley) Hanstein, in Linnæa 34: 342 (1865).
   Drymonia punctata Lindley, in Edwards's Botanical Register 28: miscellaneous matter 63 (1842).
   Alsobia punctata (Lindley) Hanstein, in Linnæa 26: 207 (1854).

3. Episcia lilacina Hanstein, in Linnæa 34: 342 (1865).
   Cyrtodeira chontalensis Seemann, in The Gardeners' Chronicle 27: 655 (1867).
   Episcia chontalensis (Seemann) Hooker f., in Curtis's Bo-

tanical Magazine 97: t. 5925 (1871).
Episcia Fendleriana Kuntze, Revisio Generum Plantarum 2: 473 (1891).
Cultivars are 'Cuprea', 'Mrs. Fanny Haage' ('Variegata'), 'Panama' and 'Viridis'.

4. Episcia fulgida (Linden) Hooker f., in Curtis's Botanical Magazine 100: t. 6136 (1874).
Cyrtodeira fulgida Linden, Catalogue no. 90: 5 and ex Andre, in L'Illustration Horticole 20: 107 (1873).

5. Episcia cupreata (Hooker) Hanstein, in Linnæa 34: 340 (1865).

var. cupreata
Achimenes cupreata Hooker, in Curtis's Botanical Magazine 73: t. 4312 (1847).
Cyrtodeira cupreata (Hooker) Hanstein, in Linnæa 26: 207 (1854).
Cyrtodeira cupreata var. metallica Regel, in Gartenflora 18: 65 (1869).

var. viridifolia (Hooker) Nicholson, Dictionary of Gardening 1: 517 (1885).
Cyrtodeira cupreata var. viridifolia Hooker, in Curtis's Botanical Magazine 86: t. 5195 (1860).
Tapina splendens Linden, Catalogue 1857 and ex Galeotti, in Journal d'Horticulture Pratique de la Belgique, new series 1: 97 (1857) [May].
Cyrtodeira Trianæ Hanstein, in Berliner Allgemeine Gärtenzeitung 25: 237 (1857). [July]
Episcia splendens (Linden) Hanstein, in Linnæa 34: 341 (1865).
Tapina variegata Linden, Catalogue and in La Belgique Horticole 17: 105 (1867).
Cultivars are 'Acajou', 'Chocolate Soldier', 'Cupreata', 'Emerald Queen', 'Frosty', 'Harlequin', 'Metallica' (C. cupreata var. metallica, 'Kitty'), 'Silver Sheen', 'Sylvan Beauty' and 'Variegata' (Tapina variegata, Episcia splendens of United States horticulture).

A New Book on Garden Annuals[1]

There are many books in print on the topic of garden annuals. Most of them are written for the novice or are rephrasings of older opinions. It is refreshing to find a new book on this old subject.

This note is not a review of the book, but is provided to direct attention to it. Angus Barber has included in it 22 lists of annuals, classified by color, size, soil adaptiveness, use, fragrance, etc. The genera and species are treated individually in encyclopedic fashion. The range of material covered is considerable and includes perennials that may be treated as annuals.

[1]Barber, A. C. "Annual Flowers: a guide to the best species and garden varieties." 278 pp., 55 photographic pls. Faber & Faber, London. 25s.

A Note on Sisyrinchium and Erianthus

The genus Sisyrinchium, a grass-like member of the Iris family and known variously as Blue-eyed-grass, Golden-eyed-grass, is widely represented over most of the New World. Its species may number 80 or more and, as is especially true of the tropical representatives, their identities and relationships have been in a state of confusion for the last century or more. In accounting for the cultivated species (as treated in Hortus III), a number have been offered sporadically, and each usually by a single source, during the last 20 years without apparently having become established in gardens. The names of these are listed below with the request that the Bailey Hortorium be advised by anyone knowing of plants of these species actually being cultivated:

Sisyrinchium bogotense	Sisyrinchium ensigerum
" cuspidatum	" pachyrhizum
" macrocephalum	(S. Sellowii, a syn.)

The Sugarcane Plume-Grass, a species of Erianthus native to the Atlantic coastal plain, is given in Hortus Second as E. saccharoides. However, as was pointed out many years ago, the oldest epithet for the species is 'giganteus', given it by Thomas Walter in 1788 when he named the plant Anthoxanthum giganteum. Since it is not an Anthoxanthum, the genus to which belongs the Sweet Vernal Grass, but is an Erianthus, Walter's epithet had to be transferred to the proper generic name. The correct name of this plume-grass is Erianthus giganteus (Walter) Muhlenberg.

This hardy grass, a large coarse reed-like plant that bears dense plumes 1-4 dm. long, is suited for bold landscape effects along pond- or stream-sides, or for establishing in open swamps and swales.

G. H. M. L.

CORNUS KOUSA RUBRA

A horticultural portrait of Cornus Kousa by Ben Blackburn appeared in "Popular Gardening" for April, 1952 (pp. 42, 43, 66, 67). In it he reported the discovery and selection, about 1940, of a pink-bracted seedling by Mr. J. Hohman. Mr. Blackburn wrote also of his visit to the botanical gardens at Nikko, Japan, and of assurances from its Director, Yoshiharu Matsumura, that "fresh clear pink in the new bracts [of C. Kousa] is not known in Japan." In view of this and of the absence of any known record for its previous description from cultivation, this pink-bracted seedling was formally described as Cornus Kousa (Buerger ex Miquel) Hance f. rubra Blackburn in "Popular Gardening," 3: 66, April, 1952.

G. H. M. L.

Keys to Cultivated Plants. 3. Autumn Crocus

George H. M. Lawrence

Two-hundred years ago, 1753 to be exact, Linnæus placed all of the kinds of crocus known to him in a single species, Crocus sativus. By this classification Linnæus recognized three groups: one, the typical element of his C. sativus, the Saffron crocus, once widely grown for the dye obtained from its style branches; two, his var. α officinalis, in which he lumped all the autumn-blooming kinds; and three, his var. β vernus, that contained all the spring-blooming kinds except the Saffron crocus. Botanists now recognize the autumn-flowering group to be composed of about 30 species.

At a casual glance one might confuse these showy members of the autumn garden with species of the autumn-flowering Colchicum. Flowers of the two genera are similar in form and in those of each genus the ovary is below the surface of the ground at flowering time. However, as shown below, the two genera are easily separable if one will examine a plant.

Colchicum	Crocus
a member of the lily family	a member of the iris family
rootstock a bulb of fleshy scales	rootstock a solid corm
ovary superior	ovary inferior
styles 3 from top of ovary	style one from top of ovary, 3 branches midway or above
stamens 6, usually in 2 ranks or levels	stamens 3

The crocus corm produces a tuft of leaves, sometimes in advance of or with the flowers or, in some kinds, after the flowers have faded or gone. The corm may produce a single flower or clusters of 2-6 or more. Each flower represents a single inflorescence and is provided with a series of bract-like structures that may seem of little value to the average horticulturist, but which are of considerable importance to the person who studies the kinds critically. A brief summary of these and other features of value in identification of crocuses is in order.

The corm is covered with a coat or tunic, which varies in different species. It may appear membranous and lack obvious fibers or strands, resembling somewhat that which covers a tulip bulb (fig. 26Bc). It may be of matted parallel fibers that split apart after the capsule matures (fig. 26Ba), or it may be of netted fibers (reticulate) and mesh-like in appearance (fig. 26Bb). In some species, the

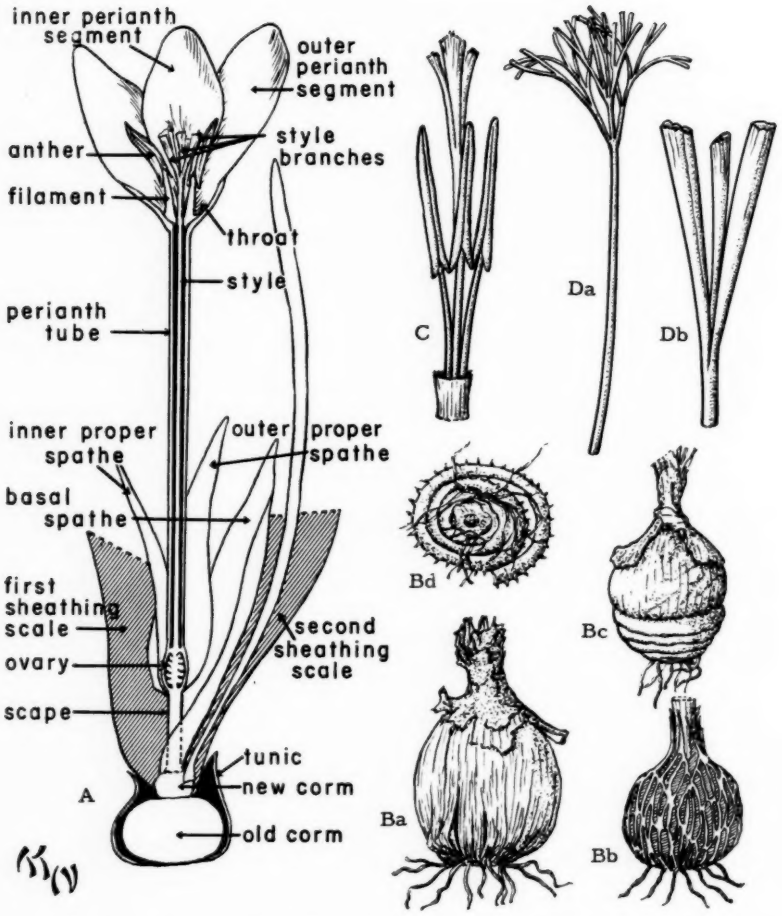

Fig. 26. A, diagram of Crocus plant (upper portion of the two sheathing scales removed). B, corm tunic types: Ba, tunic of parallel fibers; Bb, tunic of reticulated fibers; Bc, tunic annulate, upper portion membranous; Bd, same, basal view. C, portion of flower showing style branches overtopping anthers. D, types of style branches: Da, much-divided and capillary; Db, entire.

lowest third of the tunic splits around the corm into a series of narrow overlapping rings, and is described as annulate (fig. 26Bc) Although it may mean digging up a plant, the critical gardener knows these tunic characters to be very reliable and uses them when identifying crocuses.

A new corm is formed each year above the old one, its development beginning before the flower appears. From the base of the new corm, and at the top of the old one, arise 3-5 scale-leaves. Usually they are colorless and membranous, or the tips of the longest may become green with those of the others becoming expanded. At the top of the new corm, and more or less wrapped around the ovary and lower perianth tube, arises in some species a sizeable membranous bract termed the basal spathe (fig.26A).

The flower is borne on a pedicel, usually called a scape, which is situated below the surface of the ground but which elongates and pushes the capsule above ground as it matures. In most species it is about an inch long at flowering time. At its apex stand the ovary and enveloping perianth tube. Immediately beneath the ovary are two membranous spathe valves that comprise a structure of diagnostic importance, the proper spathe (fig.26A). Why it was given this name, over one hundred years ago, is not clear, but the designation has been accepted and used by all students of the genus. One of these valves (the outer) is tubular and when it is the only one present the proper spathe is said to be monophyllous. The second (the inner one) is flat and usually strap-shaped. When both valves are present the spathe is described as diphyllous.

The perianth is composed of a very long slender tube, terminated by 6 segments (tepals) in two whorls of 3 each, one whorl situated above the other. The mouth or top of the perianth tube is the throat. Its inner surface may be smooth or provided with tufts of tiny hairs (i.e., bearded).

The three branches of the style provide good diagnostic characters, although not considered to indicate natural relationships. The branches may be (1) entire, and then often with the apices slightly spreading and irregularly toothed, (2) once divided for a short or considerable distance, (3) or several times divided into 9-12 or more rather thread-like divisions (fig. 26Da). Sometimes they are funnelform at the apices, and when so may or may not be weakly to markedly fringed. Coloration of the style branches provides good distinguishing characters, and is a feature that is reasonably constant for a given species and does not vary with stages of flower maturity. The colors range from pale cream (C. candidus) to yellow (C. caspius), orange (C. nudiflorus), scarlet (C. Tournefortii), bright blood red (C. sativus), or even pale violet-purple (C. byzantinus). The relative length of the style branches to that of the stamens is also useful in separating some species. In a majority of species the tips of the style branches are pushed up and exserted for 2-8 mm. beyond the tops of the anthers. When determining if

this situation exists, one should examine flowers whose anthers have dehisced their pollen, for by then the elongation of style and stamens has ended.

In most species of Crocus the anther is longer than the filament, often 2-3 times as long. Coloration of the stamen may be uniform, or one part may be white and the other yellow or orange. In some species the filaments may be papillose; that is, covered with pimple- or wart-like pappillæ. In a few species the filaments may bear abundant hairs.

The autumn-flowering crocuses fall into two groups, those whose leaves are produced along with the flowers, and those whose leaves do not appear until after the flowers have withered and gone. Species of one group are no more hardy or more easily grown than of the other.

According to our records, twenty-three species of the autumn-flowering group have been offered in the American trade during the last 15 years but not all are currently available. All of them are accounted for in the following key and are the species of the group to be included in Hortus III. It will be appreciated if any reader noting omissions from this listing will advise me accordingly. A similar account of the spring-blooming species, with key, has been prepared for a later number of Baileya. The key that follows is provisional. Growers of these plants are invited to test it further and advise me of any points lacking clarity or accuracy. It is probable that white-flowered or other varieties not known to me and for which there is no provision in the key, may exist in some American collections. I would like to know of such instances. Plants may be grown under one name and "key out" to another. This may be due to (1) the plants being misidentified as labelled in the garden, (2) an error in the key, or (3) the plants being grown under a synonym for the correct name. A finding-list of names used for autumn-flowering crocuses is provided at the end of this key and will assist one in clarifying some nomenclatural situations.

Key to the autumn-flowering species:

1. Fls. appearing before the lvs. [see also 2nd 1, next page].
   2. Perianth throat yellow (or with yellow dots or markings) or white; style branches much divided in some species.
      3. Throat glabrous within.
         4. Style branches overtopping the stamens, the anthers yellow with white glabrous filaments; corm tunic of reticulate fibers. . . . . 1. C. cancellatus
         4. Style branches not overtopping the stamens, the anthers white with yellow pilose filaments: corm tunic thick and membranous. . . . . 2. C. pulchellus

3. Throat with tufts of hair at points of stamen attachment.

5. Perianth segms. each with 2 small orange dots at base (or at mouth of throat) inside: lvs. of previous season persisting and green, but very short and narrow. . . . . 3. C. karduchorum

5. Perianth segms. each with a yellow or white basal blotch or blush inside: lvs. of previous season shrivelled and gone.

6. Outer perianth segms. obtuse; fls. rose-lilac, throat yellow within. . . . . 4. C. Kotschyanus

6. Outer perianth segms. mucronate; fls. bluish-lavender, throat white within. . . . 4a. C. Kotschyanus var. leucopharynx

2. Perianth throat concolorous with upper half of segms: style branches much divided, often capillary.

7. Outer segms. about twice as long as inner, becoming reflexed, the inner erect; style branches white to light purple. . 5. C. byzantinus

7. Outer segms. about as long as inner; style branches yellow, orange or red.

8. Perianth segms. 5.5 cm. long or more, obtuse; plants with vermiform stolons: fls. rich purple; style brs. orange. . . . . 6. C. nudiflorus

8. Perianth segms. 5 cm. long or less, acute to acuminate; plants never stoloniferous: fls. lilac; style brs. scarlet.

9. Filaments yellow; fls. bright-lilac, the throat (when open) a star of radiating blue lines; corm tunic coarsely reticulate. . . . . 7. C. medius

9. Filaments white; corm tunic papery-membranous.

10. Fls. bluish-lilac in bud; the segms. speckled blue outside, 3.8-5 cm. long. . . . 8. C. speciosus var. speciosus

10. Fls. almost white in bud; the segms. with bluish lines outside, 5-8 cm. long. . 8a. C. speciosus var. Aitchinsonii

1. Fls. appearing with or after the lvs. [the 1st fl. of no. 20 may appear before the lvs.].

11. Perianth throat in shades of red to purple, not yellow, the throat pubescent: corm tunics of fine parallel fibers.

12. Style branches not projecting beyond anther tips; perianth segms. about 2.5 cm. long. . . . . 9. C. Cartwrightianus

12. Style branches much exserted beyond anther tips; perianth segms. 3-5 cm. long.

13. The 3 style branches entire, blood-red, the exserted portion often longer than the stamens or the perianth segms., the latter mostly 3.5-5 cm. long. . . . . 10. C. sativus

13. The 3 style branches much divided into capillary segms., the exserted portion not as long as the anthers; the perianth segms. about 3 cm. long. . . . . 11. C. asturicus

11. Perianth throat yellow, pubescent or glabrous.

14. Fls. orange, perianth segms. 2.0-2.5 cm. long. . .12. C. vitellinus

14. Fls. white or in shades of red to purple, perianth segms. often over 2.5 cm. long.

15. Style branches not exserted beyond the anther tips.

16. Fls. white, veined or spotted purple, anthers brown to blackish before dehiscing (then yellow inside the anther sacs); plants flowering in Dec. - Jan. . . . . 13. C. hyemalis

16. Fls. violet (white forms are known), anthers yellow; plants flowering in Oct. . . . . 14. C. Pallasii

15. Style branches much exserted beyond anthers.

17. Fls. lilac, lavender, or shades of red.

18. Stamens with white anthers; perianth segms. warm rosy-lilac, each with one central purple line on outside. . . . . 15. C. Tournefortii

18. Stamens with orange or yellow anthers; perianth segms. pale to bright lilac.

19. Style branches orange-yellow, not much divided; perianth segms. not striped; corm tunic of matted basal fibers; fls. not fragrant.

20. Tunics soft; proper spathe monophyllous: style brs. flabellate and erose; perianth clear lilac within. . . . . 16. C. Salzmannii

20. Tunics rigid and firm: proper spathe diphyllous: style brs. entire or sometimes toothed: perianth very pale lilac within. . . . . 17. C. caspius var. lilacinus

19. Style branches scarlet, each branch divided one-third its length or more; corm tunic of fine fibers reticulate in upper half; fls. very fragrant.

21. Perianth segms. not striped. . . . . 18. C. longiflorus

21. Perianth segms. each with 3 purple stripes on outside. . . . . 19. C. niveus

17. Fls. white (excluding the yellow throat, or veining or stripes).

22. Style branches divided 3 mm. or more.

23. Anthers yellow, twice as long as the filaments; corm tunic reticulate. . . . . .

23. Anthers white, about as long as filaments: corm tunics not reticulate.

24. Perianth segms. feathery-veined lilac; fls. very fragrant; corm tunic of one hard smooth woody piece splitting at base (usually many are superposed). . . . . 20. C. lævigatus

24. Perianth segms. not feathered lilac; fls. lacking fragrance: corm tunic of parallel fibers. . . 21. C. Boryi

22. Style branches entire, the apices sometimes toothed or erose.

25. Anthers about as long as filaments: corm tunic a thin membrane. . . . . 22. C. ochroleucus

25. Anthers twice as long as filaments: corm tunic not a thin membrane.

26. Perianth tube glabrous within, the segms. unstriped outside; style-branches yellow: corm tunic of parallel fibers. 23. C. caspius var. caspius

26. Perianth tube bearded within, the segms. dark purple outside; style branches red: corm tunic reticulate.

27. Segms. dark purple outside.

28. Throat clear yellow. . . . . 24. C. hadriaticus var. hadriaticus

28. Throat dark golden yellow more or less stained dingy reddish-purple inside and outside. . 24a. C. hadriaticus var. Saundersianus

27. Segms. white outside, marked with reddish-purple lines. . . . . 24b. C. hadriaticus var. chrysobelonicus

The nomenclature of the autumn-flowering species is much more stable than that of the spring-flowering sorts. Explanations seem necessary for only a few species.

The name Crocus zonatus was given that plant by George Maw [1832-1912], eminent British scientist whose illustrated "A monograph of the genus Crocus" (1886) stands alone for its excellence and completeness. It is most unfortunate that Maw failed to take up Carl Koch's earlier though less pleasing name of C. Kotschyanus for this species. Gradually this earlier and valid name is displacing Maw's more widely used but illegitimate name. It is encouraging to note that the more particular catalogue writers now treat the name C. zonatus as a synonym.

In one other instance Maw failed to adopt the oldest name for an autumn-flowering crocus when he took up the more descriptive name Crocus iridiflorus of Heuffel for the plant correctly known as C. byzantinus. Even in Maw's time, the Rules of Nomenclature did not sanction rejection of a name because it lacked euphony, was not descriptive, or was otherwise misleading in connotation. The epithet byzantinus was given the Iris-flowered crocus by John Ker-Gawler, and had been accepted by such specialists as Dean Herbert and J. D. Hooker at the time of Maw's work. It is true that the species comes from Rumania and not Byzantium (now Istanbul, Turkey), and that its long deflexed outer perianth segments and short erect inner ones suggest an iris flower, but these reasons may not cause a later name to take precedence over an earlier one. Ker-Gawler's name, C. byzantinus must stand.

The name C. Karduchorum was given by Maw to a species of this group, based on an herbarium specimen from Turkestan. Later the name was applied to a plant in the trade in the belief it was Maw's species. A rather recent study of these plants by B. L. Burtt, of the Edinburgh Botanic Garden, showed that the cultivated material passing as C. Karduchorum, Maw was not that species, but a white-throated variety of C. Kotschyanus which grows wild in southern Turkey. Burtt named it C. Kotschyanus var. leucopharynx.

The name C. niveus, E. A. Bowles may be unfamiliar to some crocus enthusiasts. It is that of the hardy robust plant known to many as C. marathonisius or C. Boryi var. marathonisius. It was pointed out by Burtt [Gardeners' Chronicle, 124: 134, 1948] that C. marathonisius as originally described by Heldreich is not different

from C. Boryi, but that the plant in cultivation is not that species. The earlier opinion of Bowles (1900) that the cultivated material passing under Heldreich's name was a new species which he named C. niveus was upheld by Burtt's studies. The species is figured and described in detail in Curtis' Botanical Magazine for 1951 [vol. 168, pl. 146].

One other note regarding speciation in this group should be made with regard to C. sativus, the Saffron Crocus, and its allies. As a result of more recent collections from the islands of the Greek archipelago by Dr. Karl Rechinger of Vienna, and others, Burtt has concluded that most of the so-called varieties of C. sativus are better treated as separate species. This accounts for the presence in the above key, and ultimately in Hortus III, of the names C. Cartwrightianus, and C. Pallasii.

Some of the species of this group are more hardy, and others more tender, than the majority. Not all have been grown at Ithaca, but judging from experience here, and from notes in the American literature, two short lists have been prepared as follows:

The more hardy species	The less hardy species
C. Kotschyanus	C. Boryi
C. medius	C. cancellatus (hardy in N. J.)
C. niveus	C. hyemalis
C. nudiflorus	C. Tournefortii
C. ochroleucus	C. vitellinus
C. Salzmannii	
C. sativus	
C. speciosus	

A finding-list of names applied to the autumn-flowering species is given below. Underscored names, followed by that of their author, are treated as valid and others are synonyms. Names of selected cultivars and clones believed to be among the more widely cultivated are included in the Hortus III treatment and are also given below with the species to which they belong. Numbers in brackets following valid names are sequence numbers of same names in above key.

asturicus, Herbert [11]
  cv. 'Atropurpureus'
Boryi, J. Gay [21]
  var. marathonisius, Hort. - C. niveus
  var. Tournefortii, (Gay) Baker - C. Tournefortii
byzantinus, Ker-Gawler [5]
cancellatus, Herbert [1]
Cartwrightianus, Herbert [9]
caspius, Fischer & Meyer [23]
  var. lilacinus, Bowles [17]
Fontenayi, Halacsy - C. lævigatus, but not its Cv. 'Fontenayi'

hadriaticus, Herbert [24]
  var. chrysobelonicus, Herbert [24b]
  var. Saundersianus, Herbert [24a]
  cv. 'Wilhelmii' may be same as var. Saundersianus
hyemalis, Boissier & Blanche [13]
iridiflorus, Heuffel - C. byzantinus
Karduchorum Maw (not cult.) [3]
Karduchorum, Hort. not Maw - C. Kotschyanus var. leucopharynx
Kotschyanus, Koch [4]
  var. leucopharynx, Burtt [4a]
lævigatus, Bory & Chaubaud [20]
  var. Fontenayi, Bowles, [not C. Fontenayi, Heldreich] - cv. 'Fontenayi'
longiflorus, Rafinesque [18]
  var. melitensis, Herbert [18a]
marathonisius, Heldr. - C. Boryi
marathonisius, Hort. not Heldr. - C. niveus
medius, Balbis [7]
niveus, Bowles [19]
nudiflorus, J. Smith [6]
ochroleucus, Boissier & Gaillon [22]
odorus, Bernardi - C. longiflorus
Pallasii, Bieberstein [14]
Pallasii var. Cartwrightianus, (Herbert) Hayek - C. Cartwrightianus
pulchellus, Herbert [2]
Salzmannii, J. Gay [16]
sativus, L. [10]
  var. Cartwrightianus, (Herbert) Baker - C. Cartwrightianus
  var. Pallasii, (Bieberstein) Baker - C. Pallasii
speciosus, Biebersteinii [8]
  var. Aitchisonii, M. Foster [8a]
  cv. 'Globosus'
Tournefortii, J. Gay [15]
vitellinus, Wahlenberg [12]
zonatus, J. Gay - C. Kotschyanus

Chrysothemis and Tussacia

Harold E. Moore, Jr.

One of the gesneriads that has been offered for sale in the United States bears the name Tussacia Friedrichsthaliana Hanstein It is a fleshy herb, native in Central America, having yellow flowers spotted with orange on the limb. The calyx is unusual in having a five-angled or five-winged tube with only very short free lobes at the tip. Another species from the West Indies, originally described as Besleria pulchella, has been known as a cultivated plant in Europe since early in the 19th century and additional species are native in the American tropics.

Routine checking of the place in which the genus Tussacia was published has disclosed an error of long standing and one that can no longer be ignored under the current International Code of Botanical Nomenclature. Tussacia is usually attributed to the German botanist Reichenbach, who is said to have published it in his Iconographia Botanica Exotica 1: 28, t. 41 (1827). Referring to the proper page, however, one finds that Reichenbach discussed Besleria pulchella and some of the gesneriads related to it, proposing only to use the name Tussaca in the event that further studies showed it to be a distinct genus. He obviously accepted Besleria pulchella, both in the text and in the plate accompanying it, and was aware that the American naturalist Rafinesque had previously used the name Tussaca for a genus of orchids that we know today as Goodyera.

In later publications, Reichenbach and others used the name Tussaca or its alternate spelling Tussacia a number of times but without description so that these names lack validity. The name Tussacia was also used by Schultes and Schultes filius in 1829 and by Beer in 1857 for genera of other families. It was not until 1846 that Bentham described it formally in its accepted sense of today.

Considering these factors, one finds that the name Tussaca or Tussacia cannot be used for two reasons. Firstly, it is a later homonym of Rafinesque's name and must be rejected under Article 74 of the Code; secondly, it was proposed without actual acceptance by Reichenbach (a provisional name) and must be rejected under Article 43 of the Code.

To replace Tussaca or Tussacia, we may use the generic name Chrysothemis, proposed by the French botanist Joseph Decaisne in 1849. Originally, Chrysothemis included Chrysothemis pulchella

and another species, C. venosa Decaisne. The latter is now known as Episcia melittæfolia (Linnæus) Martius. An earlier use of the same generic name does not affect its application to the gesneriad genus because no description accompanied it and it is therefore without botanical standing.

Since a combination in the proper genus is needed for the plant that has been cultivated in the United States it is supplied here. Four other species now listed as Tussacia, T. rupestris Bentham, T. semiclausa Hanstein, T. villosa Bentham and T. Woodsonii Morton may eventually need to be transferred. They have not been studied and are left for a future student of the genus. The names Chrysothemis venosa Decaisne and C. melittæfolia (Linnæus) G. Don ex Loudon apply to Episcia melittæfolia and are excluded from further consideration. Pertinent literature citations for the genus and the two species that have been cultivated are included below for the inquiring horticulturist or botanist.

Chrysothemis Decaisne, in Revue Horticole 21: 242 (1849) and 22: 381 (1850) excluding C. venosa, not Chrysothemis Klotzsch ex Schomburgk, Reisen in Britisch Guiana 3: 1083 (1848) [name only].

Type-species, Chrysothemis pulchella.

Tussaca Reichenbach, Iconographia Botanica Exotica 1: 28, t. 41 (1827) [provisional name].

Reichenbach, in Mössler's Handbuch der Gewächskunde, 2nd edition, 1: xxxvii (1827) [name only as Tussaca] and 3rd edition, 1: lxxvii (1833) [name only as Tussaca].

Reichenbach, Conspectus Regni Vegetabilis p. 125 (1828) [name only as Tussacia].

Bartling, Ordines Naturales Plantarum p. 175 (1830) [name only as Tussacia].

Reichenbach, Repertorium Herbarii sive Nomenclator Generum Plantarum 1: 120 n. 4683 (1841) [name only as Tussaca].

Bentham, in The London Journal of Botany 5: 360, 363 (1846) [as Tussacia].

Oersted, Centralamericas Gesneraceer p. 39 (1858) [as Tussacia].

Hanstein, in Linnæa 34: 245 (1865) [as Tussacia], not Tussaca Rafinesque (1814) nor Willdenow ex Schultes & Schultes (1829) nor Tyssacia Reichenbach ex Steudel, (1841), nor Klotzsch ex Beer (1857).

Skiophila Hanstein, in Linnæa 26: 207 (1854) in part.

Chrysothemis Friedrichsthaliana (Hanstein) comb. nov.

Tussacia Friedrichsthaliana Hanstein, in Linnæa 34: 337 (1865).

Chrysothemis pulchella (Donn) Decaisne, in Revue Horticole 21: 242 (1849).

Besleria pulchella Donn, Hortus Cantabrigiensis p. 140 (1796).
Episcia pulchella (Donn) Martius, Nova Genera et Species Plantarum 3: 45 (1829).
Chrysothemis aurantiaca Decaisne, in Revue Horticole 22: 381 with plate (1850).
Skiophila pulchella (Donn) Hanstein, in Linnæa 26: 207 (1854).
Tussacia pulchella (Donn) Reichenbach ex Oersted, Centralamericas Gesneraceer 39 (1858).

ENDINGS OF SOME LATIN NAMES

The scientific name of a species is composed of 2 words - of a variety, 3 words - the generic name and the specific epithet (plus a varietal epithet if appropriate). When a plant having a scientific name is named for a person, the Latin form is in the genitive case - Lilium Henryi, meaning Henry's lily.

When the commemorated name ends in any consonant other than the letter "r" the genitive masculine ending is a double "i." The epithets Burkwoodii, Menziesii, Youngii, and Zabelii are examples. However, when the name of the commemorated person ends in a vowel or the letter "r," the genitive masculine ending is a single "i," and the epithets Bantai, Fortunei, Conzattii, (after Conzatti), Hugoi,. Purdyi, and Kaempferi are examples.

Formerly, not all botanists adhered to this rule of using the double "i" in the genitive case for epithets commemorating personal names ending in consonants (except "r"), and one finds, for example, that Nakai made the name Cotoneaster Wilsonii but Rehder named a maple Acer Wilsoni for the same man. It was also formerly true that, subject to certain few exceptions, the original spelling of a name must be retained; Wilsonii vs. Wilsoni, Davidii vs. Davidii, etc.

In 1950 the botanists agreed to treat the previous use of the single "i" when preceded by a consonant (except "r") as an orthographic error that may be corrected, and provided that the double "i" be used from then onward as appropriate. This agreement, now a part of the International Code of Botanical Nomenclature, was anticipated in "Hortus Second" and in Bailey's "Manual." It will be followed in "Hortus III." This note is to provide an explanation of what may seem to be inconsistencies in practise. Since 1950 it has been correct to change all single "i" terminations to "ii" if the name ends in a consonant other than "r." Persons publishing writings using Latin names of plants will do a service by being particular in these matters.

When the epithet commemorates a lady, the final "i" is replaced by "ae," as Sargentiæ, Vailiæ, and Willmottiæ.

G. H. M. L.

The Cultivated Shrubby Potentillas[1]

H. L. J. Rhodes [2]

Although for some time several of the forms of Potentilla fruticosa and its allies have been recognized as choice ornamentals in Britain and continental Europe, this group of low-growing shrubs has received little horticultural attention in North America until recently. In selecting ornamentals with more than one reason of interest, discerning landscapers may be expected to make increased use of shrubs that bloom repeatedly from spring until fall. Though the shrubby Potentillas have neither showy fruits, brilliant autumn color, nor graceful winter twigs, most of them are rarely without flowers from June until October, and during their two or three flushes of heavy bloom are covered with thousands of small bright yellow, pale yellow, cream, or snow-white flowers.

These plants have for long borne in our language, the cumbersome name of "shrubby cinquefoil." In German the common name is Fingerkraut. The author proposes the name "fingerbush," a free translation of the German name, as a suitable English name for Potentilla fruticosa and related species.

Fingerbushes thrive best in full sun in well-drained garden soil. They require little care except an occasional pruning out of the older stems, which usually become prostrate by the second year. They are very resistant to drought on account of their long, wiry, much-branched root system. Those that are winter-hardy enough are invaluable on the Great Plains, but probably none of the semi-evergreen gray-leaved forms from south-central Asia will withstand temperatures below 0 F. The collection at Ottawa has maintained excellent growth in a heavy clay soil under five-inch sawdust mulch with ammonium nitrate added periodically.

Fingerbushes are readily propagated from softwood or hardwood cuttings. For the former, succulent shoots grown out about an inch from headed stems are best if sufficient humidity is provided; for the latter, four-inch sticks with a basal node, cut serially from long shoots of the previous season, should be used. Plants that are heavily mulched or that have soil mounded up around the base can be divided easily. Fresh seed germinates quickly without any treatment.

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[2]Assistant Botanist.

In the landscape plan fingerbushes are useful in foundation plantings and borders, and most of them make attractive free-flowering or clipped hedges. The dwarf types are favorite shrubs for rock gardens.

The fingerbushes are usually included in the largely herbaceous genus Potentilla in the family Rosaceæ, but some botanists, including Rydberg, Nakai, and Russian botanists, have placed them in a separate genus Dasiphora. Besides the fingerbushes, other woody Potentillas sometimes cultivated are P. Salesoviana, Stephan (Comarum Salesovianum (Steph.) Asch. & Graebn.) from Siberia, a gaunt shrub with coarse, scarcely branched stems three feet high bearing large dark green pinnately compound leaves, and P. tridentata Ait., a prostrate spreading evergreen with three-toothed glossy leaves making a dense groundcover in moist woodland conditions. Neither of these two species blooms repeatedly.

Tendencies toward dioecism are often found in the fingerbushes. P. davurica "Beesii" is completely staminate, and among populations individual plants may have poorly developed carpels or stamens.

In the native state fingerbushes are found over wide areas in the northern hemisphere in diverse habitats, including sphagnum bogs, river shores, open prairie, and mountain slopes and ledges. There is one species in North America, Europe and western Asia, (P. fruticosa L.) and a complex of two or more highly variable species in central and eastern Asia. Most of the useful garden forms are derived from the Asiatic complex, but P. fruticosa is involved in some of the hybrids.

There are probably few other groups of flowering shrubs in which the names of plants offered for sale are more frequently confused, or in which the taxonomy is less clearly understood. Some of the reasons are that fingerbushes are an extremely polymorphic group, that they are cross-pollinated and mostly interfertile, and that their center of diversity is in the relatively inaccessible and incompletely explored regions of Asia. Most of the described cultivated forms apparently represent variants collected at random from scattered points in the distribution. For this reason these cultivated forms are here treated as cultivars rather than botanical varieties or forms.

In Rehder's Manual the treatment of all the fingerbushes as a single species (P. fruticosa L.) represents a very conservative concept of the group. C. Schneider in his "Handbuch der Laubholzkunde" 1: 522 (1905), and T. Wolf in his "Monographie der Gattung Potentilla" (in Bibl. Bot. 6: 60, 1903) maintained P. davurica Nestl. as a separate species. Handel-Mazzetti in Acta Horti Cotoburgensis 3: 289 et. seq. (1940), and Fletcher in "Notes from the Royal Botanic Garden," Edinburgh 20: 207 et seq. (1950) have recognized four species and several natural hybrids. Juzepezuk in "Flora S.S.S.R." 10: 68-73 (1941) accepted six species for the U.S.S.R. alone and he mentioned several geographical races of doubtful taxonomic status.

Fig. 27. Potentilla davurica with separate flower showing calyx and calyx-bracts, all x 2.

Fig. 28. Potentilla parvifolia with separate flower showing calyx and calyx-bracts, all x 2.

Handel-Mazzetti reinstated P. glabra Lodd. as the name of the white-flowered plant of Asia because P. davurica Nestl. was described (from a herbarium specimen) as having yellow flowers. The flowers of all the fingerbushes become dull yellow on dried specimens after about a year, so the living plant may have had white flowers. Moreover, Handel-Mazzetti himself mentioned (op. cit. p. 295) that it is very difficult to distinguish the white- and yellow-flowered plants of Central China without knowing the flower color. Unless more satisfactory characters can be found to distinguish the more southerly, yellow-flowered populations (called P. arbuscula Don. by Handel-Mazzetti) from the more northerly white-flowered ones, it seems best to consider them both variants of the one species P. davurica Nestl. Hence in this article three species, P. fruticosa, P. davurica, and P. parvifolia are accepted. The last, P. parvifolia Lehm., differs from the other two in such fundamental characters as shape of the style (filiform instead of club-shaped), small seed size, and length of the inflorescence (short peduncles); and it is a much finer plant in general texture.

The identification of fingerbushes is most easily accomplished from living plants flowering in spring (in vernal bloom). Identification from plants flowering in late summer or autumn (in autumnal bloom) should be avoided if possible, since autumnal bloom may have some important identification features highly modified. The autumnal bloom is produced in terminal clusters on the new stems; the vernal bloom on the old wood usually is composed of much larger flowers that are in small clusters, or even solitary in some kinds. The reddish tinge on the back of the calyx lobes in some forms is usually absent on autumnal bloom. The separations used in the following key will be found inadequate in distinguishing the multitudinous variants in Asiatic populations, but it is hoped that this key will account for the more generally cultivated forms. Of the named cultivars only the most morphologically distinct are included.

(floral characters based on vernal bloom)

1. Foliage uniformly fine; leaves 1 - 1.5 cm. long, densely clothing the flowering shoots; flowers bright yellow, 1 - 1.5 cm. across; fruiting stalks mostly hidden in the new growth. . . . . P. parvifolia 'Gold Drop'

1. Foliage coarser or irregularly fine leaves .5 - 4 cm. long, usually sparse on flowering shoots flowers to 3 cm. across; fruiting stalks mostly conspicuous beyond the new growth.

   2. Calyx lobes reddish on the back; flowers sulphur yellow; foliage texture intermediate. . . . . P. x Rehderiana

   2. Calyx lobes green on the back, or flowers white.

      3. Leaflets obovate-oblong to obovate, drawn in at the tip; calyx bracts usually broader and shorter than the sepals.

         4. Petals pure white; leaves light or bright green.

            5. Leaves glabrous; plant dwarf. . . . . P. davurica (typical)

Fig. 29. Potentilla fruticosa with separate flower showing calyx and calyx-bracts, all x 2.

5. Leaves more or less silky hairy.
   6. Flowers mostly with supernumary petals. . . . . P. davurica 'Snowflake'
   6. Flowers all single.
      7. Stems erect, to 1.5 m. high. . . . . P. davurica 'Veitchii'
      7. Stems spreading less than .5 m. high . . . . . P. davurica 'Mandshurica'
4. Petals creamy white to yellow; leaves gray-green.
   8. Stems to 1 m. high; flowers creamy white . . . . . P. davurica 'Vilmoriniana'
   8. Stems less than .5 m. high; flowers bright yellow . . . . . P. davurica 'Beesii'
3. Leaflets ovate to oblong, tapering gradually to the tip; calyx bracts usually narrower and longer than the sepals.
   9. Flowers pale yellow to white. . . P. x Friedrichsenii and seedlings
   9. Flowers bright yellow.
      10. Leaves mostly 5. pinnate; stems erect. . . . . P. fruticosa
      10. Leaves ternate; stems creeping. . . . P. fruticosa 'Pyrenaica'

Potentilla parvifolia, especially when crossed with other forms, will continue to provide valuable free-flowering strains and hybrids. The ornamental value of the plant is enhanced by the way the new growth partly hides the clusters of fruiting calyces. Hailing from the dry plateau regions of central Asia, this species thrives under dry, hot conditions, and it is very winter-hardy. 'Gold Drop', with mostly 7 leaflets and bright yellow flowers, is the commonly cultivated form. 'Katherine Dykes' is apparently a seedling of this species. P. parvifolia 'Farreri' is a doubtful plant its name is often applied to 'Gold Drop'.

P. x Rehderiana Hand.-Mazz. is thought to be a hybrid between P. parvifolia and P. davurica. Like P. parvifolia, it sets very little seed when open-pollinated in cultivation. It was first described by Rehder as P. fruticosa var. Purdomii from plants raised from seed collected in N. China (Purdom No. 848).

P. davurica has yielded diverse types of plants differing widely in habit and hardiness. P. davurica 'Beesii' is winter-killed at Ottawa, and probably the other gray-leaved forms will prove equally tender. On the other hand typical P. davurica and P. davurica 'Mandshurica' are hardy on the Canadian prairies. The little grown 'Albicans', which originated as a seedling at Rochester, New York, differs from 'Beesii' in its perfect flowers and in the densely glandular undersurface of its leaves. 'Snowflake' is a tall bush with intermittent masses of gay white semi-double flowers.

P. x Friedrichsenii Spæth is presumably a hybrid between P. fruticosa and P. davurica. The form commonly cultivated needs a cultivar name, and the author proposes 'Berlin Beauty'. Seedlings of this hybrid vary greatly in flower color, habit, and leaf texture.

Two of these that have been described as botanical forms are 'Ochroleuca', with creamy white flowers, and 'Beanii', with pure white flowers.

Potentilla fruticosa as commonly seen in the native state in North America is a straggly plant, at least in age, and except during the first flush of bloom in spring, it is not as floriferous as most of the cultivated varieties. Possibly some of the alpine and arctic strains with large flowers would prove to be useful dwarf shrubs. The plant cultivated as P. fruticosa pyrenaica, and sometimes sold as P. fruticosa 'Farreri Prostrata', may not be related to the form that grows in the Pyrenees. 'Friesengold' is an excellent low plant with an abundance of well-formed light yellow flowers. 'Manelys' or 'Moonlight' is a bushy plant with lemon-yellow flowers and blue-green leaves that betray a touch of parvifolia.

The most comprehensive collection of fingerbushes maintained by a commercial nursery company appears to be that of Hillier and Sons, Winchester, Hants, England. Several nursery firms on continental Europe offer most of the cultivated forms. The collection at the Dominion Arboretum and Botanic Garden, Ottawa, Canada contains nearly all the cultivated forms and many hybrid seedlings. Chromosome counts have been made on most of the strains in the collection by Dr. W. R. Bowden of the Botany Division.

Kohleria Lindeniana

Harold E. Moore, Jr.

A footnote to the key to cultivated species of Kohleria in Baileya 1: 91 (1953) referred to the lack of a name in the genus Kohleria for plants offered in the trade under the erroneous name Gesneria Lindenii. This lack has been remedied in Gentes Herbarum 8: 380-383 (1954) and the name Kohleria Lindeniana should now be used.

Kohleria Lindeniana is unusual in the genus because of the white-and-violet flowers that make it immediately recognizable when in bloom. Its culture is similar to that of K. amabilis and K. bogotensis which it much resembles in habit. The original material was thought to have come from Ecuador and reached Europe early in the 1860's. Colored illustrations of it appeared in Gartenflora 17: t. 589 (1868) where it was called Tydæa Lindeniana and in L'Illustration Horticole 20: t. 147 (1873) as Tydæa Lindenii. A line drawing is reproduced here from Gentes Herbarum as figure 30, and the several synonyms by which the species may be located in horticultural or botanical literature follow.

Kohleria Lindeniana (Regel) H. E. Moore, in Gentes Herbarum 8:

Tydæa Lindeniana Regel, in Gartenflora 17: 257, (1868).
Tydæa Lindenii Regel? ex Andre, in L'Illustration Horticole 20: 183, (1873).
Isoloma Lindenianum (Regel) Nicholson, Illustrated Dictionary of Gardening 2: 201 (1885).
Gloxinia Lindeniana (Regel) Fritsch, in Österreichische Botanische Zeischrift 63: 66, (1913).

Note: for fig. 30, showing Kohleria Lindeniana, see p. 98.

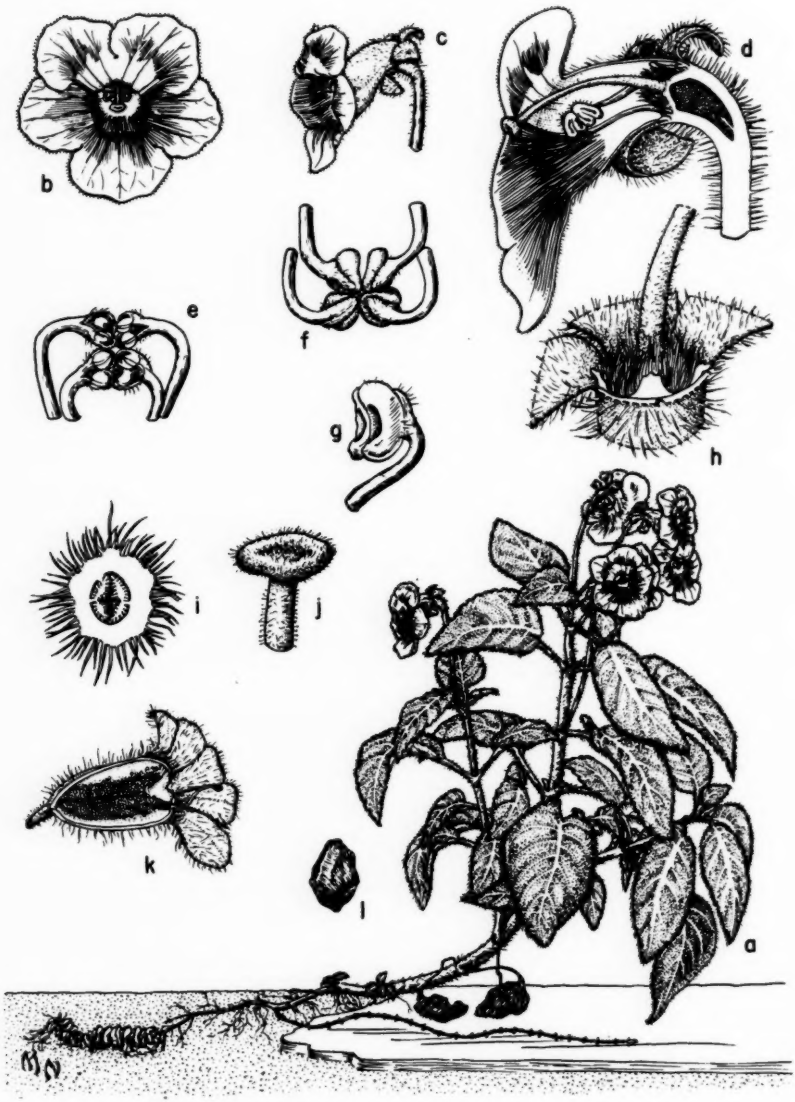


Fig. 30. Kohleria Lindeniana. a, habit x1/2; b, c, flower, face view and side view x1; d, flower, vertical section x2; e, f, anthers, ventral and dorsal views x4; g, anther, lateral view x5; h, apical portion of ovary and disk-glands x5; i, ovary cross-section x4; j, stigma x5; k, capsule x1, l, seed x20. [Reprinted from Gentes Herbarum 8: 381, 1954.]

Habit Forms of Acer saccharum

Bernard Harkness
Highland Park Herbarium
Rochester, New York

Present botanical treatment admits but two habit forms[1] of Acer saccharum, which does not adequately account for what may be found in collections or be purchased from nurseries. Two clones are involved, both introduced by the same nurseryman, F. L. Temple, when owner of the Shady Hill Nurseries at Cambridge, Mass. Temple gave to his first introduction (in 1885) the name "columnare," and to the second (in 1887) "monumentale." Unfortunately, in subsequent botanical and horticultural treatments the epithet "monumentale" has been applied to the narrower tree introduced by Temple as "columnare." Conversely, the wider and more useful clone also has generally been called "columnare" in the fewer references made to it. In the presence of this confusion and with regard to the history and associations of the trees, two new clonal names are here proposed for use in nursery lists and horticultural literature. The names "columnare" and "monumentale" should be rejected under the authority of Sect. D, Art. C. 10 of the International Code of Nomenclature for Cultivated Plants, wherein it is provided:

"When revival of the earliest cultivar-name would cause confusion, it is to be listed as a synonym."

Acer saccharum cl. 'Newton Sentry' (fig. 00-B)

In "Horticulture" of March 15, 1924, A. H. Fewkes recorded some of the history of this clone. He reported that in 1871 and 1872 the tree grew in the yard of the Claflin Grammar School, Newtonville, Mass. Sometime before 1885 it was moved and became established in Newton Cemetery, for in that year Jackson Dawson reported that he took scion material from the tree. Somewhat earlier F. L. Temple propagated stock from it and listed it in his 1885-86 catalogue. Temple's catalogue description in 1887 was as follows:

"Acer saccharinum columnare

This is a most remarkable form of the Sugar Maple, which grows in a compact, columnar shape, the most picturesque tree in this latitude. The original tree of this sort is 30 feet high, and only 2 1/2 feet in diameter at the top. The leaves are thick and leathery, and of a very dark color, which gives it a rich appearance. This tree which was in-

[1]If ever successfully introduced into cultivation, the unique tree in North Woodstock, N. H., named by Fernald as A. saccharum f. conicum should be treated as a clone.

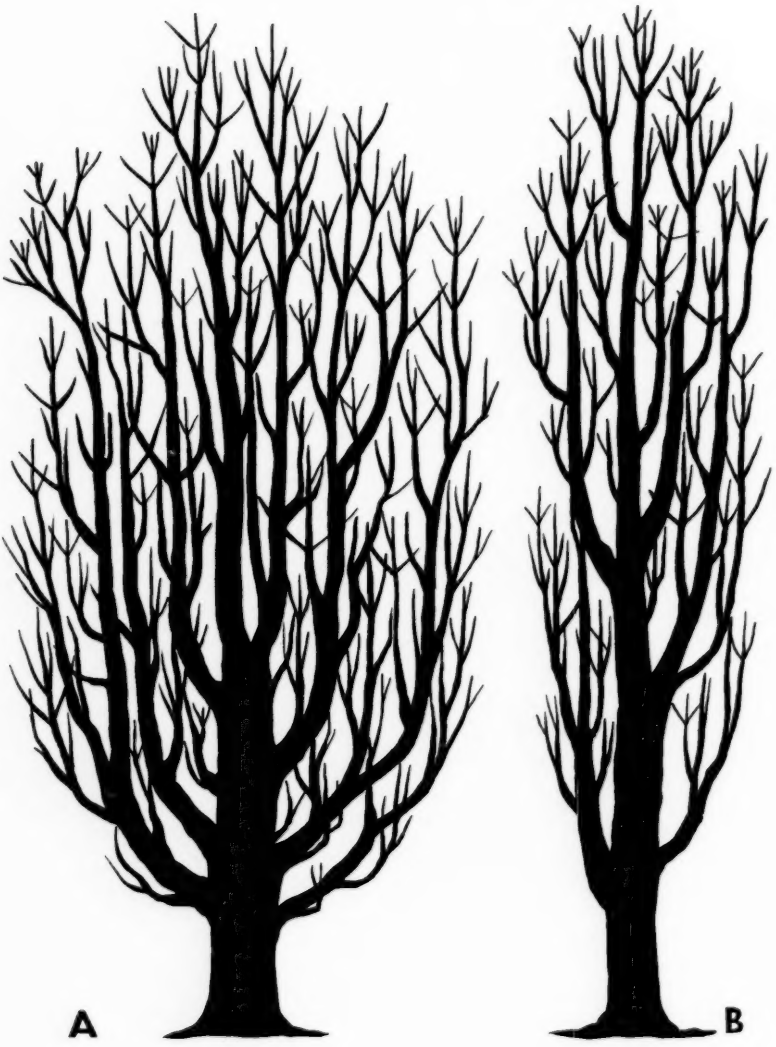


Fig. 31. Acer saccharum, silhouette of branch systems: A, 'Temple's Upright'; B, 'Newton Sentry'.

troduced by me, is a most remarkable one, and will be the parent of a new type of lawn and landscape tree, until now missed in this country, picturesque towering shafts of foliage to crown a hill, or lift up the center of level plantations. I have the entire stock of this tree, and take great pleasure in offering it to my customers."

The above catalogue description indicates that the tree matching this description, and now in Newton Cemetary, was the source of Temple's "columnare." Dark, thick and leathery leaves are characteristic of Newton Sentry Maple, as evidenced by its being once considered by Sudworth and by Rehder to be a form of A. nigrum.

A confusing entry was made by Rehder in the synonymy of his A. saccharum f. monumentale as given in his "Bibliography of Cultivated Trees and Shrubs" (1949) where he referred to a Plate 5 in Temple's Catalogue for 1889. This statement seems to have been derived from Sudworth's reference to "Temple's Cat. Trees, Shr., Pl[ants]., [page] 5 (1889)." No illustration of either of his maple introductions was published by Temple. Rehder misinterpreted Pl. for "plate" when examination of the catalogue would have shown it to stand for "plants."

I visited the original tree in Newton Cemetary in March of this year. It is identified by a bronze marker placed beside it in 1937 by a local chapter of the Daughters of the American Revolution. Its dbh (diameter breast high) is 3 dm.; its height an estimated 14 m. Structurally the specimen is not strong, as the angles of its ascending branches are weak. It has suffered the loss of one branch but, if spared too severe storms, it may live for many years.

Our records at the Rochester Parks indicate that Newton Sentry Maple was received there as buds for propagation from the Arnold Arboretum in July, 1922. Two trees prominently located in front of Lamberton Conservatory, Rochester, have had their secondary branches removed because of awkward placement, a situation that results in non-typical, single-trunked specimens. With trunks of 15 cm. (dbh) and heights of 10 m., these perpendicular accent trees are clothed with horizontal branchlets extending two feet or less. More typical specimens are in the Arnold Arboretum maple collection and are occasionally found, also, in older estate plantings. I consider Newton Sentry Maple to be of secondary importance for ornamental use.

Acer saccharum cl. 'Temple's Upright' (fig. 31-A)

The origin of this clone seems never to have been recorded. Certainly it is but one of many broader but slow-growing upright types that have been noted some by botanists over the years. No inclusive botanical forma, however, can be found to have been proposed. This maple is Temple's 1887-88 introduction which he called "monumentale," and described thus:

"A. s. monumentale
Another variety with similar habit, except that the lower part of the top grows somewhat wider, the whole top making a greatly elongated bell-shape. Original tree 33 feet high and 3 1/2 feet wide across lower branch."

It is interesting to note that the Ellwanger and Barry nursery, despite Temple's apparent preference for the narrower tree, bought and propagated the broader tree. The tree from which their nursery stock was grown still stands near the old office building on Mt. Hope Ave., Rochester. It is large (dbh - 5 dm.; height - 15 m.) and far surpasses in size the original of Newton Sentry Maple. For years the Ellwanger and Barry catalogue listed "Monumental Sugar Maple," described and identified as follows:

"A. saccharinum monumentalis
A fine variety of the Sugar Maple, of pyramidal compact habit, the foliage of the second growth is of a brilliant crimson, which contrasted with the rich green of the older foliage produces a charming effect. Distinct and handsome."

In Rochester this clone has been used for planting the narrower streets where the normal-sized trees become liabilities. Westfield Street, in the south-western part of the city, now has a complete planting where trees of 6 m. height make a pleasing vista. It has attracted the attention of nurserymen who are producing street trees. Promotion has been hindered, however, because of the nomenclatural confusion and misidentity of this clone with true 'Columnare'. Both have passed under the same name. It is hoped that this rejection of the confusing Latin epithet and substitution of the name 'Temple's Upright Maple' will correct the situation. The tree has real merit for ornamental plantings.

The distinguishing characters of these two clones are:

Sugar Maple 'Newton Sentry' (fig. 31-B)	Sugar Maple 'Temple's Upright' (fig. 31-A)
Many ascending branches.	Few ascending branches.
No dominant central leader.	Strong central leader which produces stubby lateral branches especially when secondary branches are removed.
Leaves dark green, leathery texture, margins wavy (as of Black Maple).	Leaves yellow-green, not leathery, margins plane (as of Sugar Maple).

The Cultivated Alliums

Harold E. Moore, Jr.

The odors of onion and garlic are familiar in most American kitchens yet the ornamental value of the genus Allium, to which these plants belong, is far too little appreciated. Thousands of acres are devoted to growing the onion, but little space is allowed for the bright array of many other species. In addition to a relatively few species of Allium used for culinary purposes, there are perhaps 125 species that are or have been occasionally grown for ornament in the garden and many more are known only from the wild state. Some of the latter are beautiful and adaptable subjects for cultivation and the better of them are slowly being added to the already long list of cultivated alliums.

The flowers of these garden alliums embrace a wide range of color and form. Colors are to be had from dull and shiny whites through shades of pinks, rose, light and dark blue, violet and reds so deep as to be nearly black, to subtle shades of yellow-green and to brilliant yellow. Contrary to general thought, some species have delightfully fragrant flowers, the onion odor being apparent only when the plants are bruised. There are low species most satisfactory for the rock garden and giant species as tall as a man. There are species that may be used in a shaded border or in woodland plantings, and others that make good clumps or mass effects in the open sun.

Most species are hardy, even in our northern states, and are not demanding in care. Indeed some are inclined to become weedy. This is particularly true of the eastern Allium tricoccum and the species such as A. canadense var. canadense and A. vineale that multiply by means of bulbils replacing the flowers. But ease in growing Alliums does not mean that it is easy to tell just what Allium is being grown.

The characters used to distinguish species in the genus are not always easily observed. It is perhaps for this reason that so many are found under completely erroneous names. An illustration of this may be seen from specimens included in the Bailey Hortorium folders of a few very common species. Allium Schoenoprasum, our common chives, has been grown and sold under a great variety of names, amongst them Allium Ampeloprasum, A. angustoprasum, A. darwasicum, A. frigidum, A. Ledebourianum, A. libanii, A.

oleraceum, A. 'Ruby Gem', A. scaposum, A. 'Siskyou Mt.', A. tibeticum, A. Wallichianum, and A. Winklerianum. The variable and ornamental Allium senescens has been distributed under an even longer list, including A. acutangulum, A. albidum, A. ammophilum, A. angulosum, A. crenulatum, A. cyaneum, A. falcatum, A. falliax, A. Huteri, A. japonicum, A. libanii, A. macranthum, A. maritimum, A. montanum, A. moschatum, A. 'Mt. Cenis', A. nutans, A. obliquum, A. oreophilum, A. pallens, A. paradoxum, A. Purdomii, A. pyrenaicum, A. Schubertii, A. speciosum, A. Stellerianum, A. tanguticum, A. tartaricum, A. tibeticum, A. triquetrum, A. validum, A. Villarsii, and A. zebdanense.

To assist the gardener who has already established alliums in his garden and to guide persons who may want to add them to their collections, a series of articles on the identification of such species as are offered in commercial lists, or are known to be grown in collections in the United States, will follow in Baileya. In this first article of the series, attention is given to the genus Allium as a whole, to the subdivisions in which it may be broken for the more ready recognition of large groups of related species, and to three alliums that are not necessarily related but that are easily distinguished because of the broad leaf-blades.

The genus Allium itself is both large in number of species and in area of distribution. Perhaps as many as 500 species are known. They are found throughout most of the northern hemisphere, a majority of the species occurring within the Soviet Union. In the Old World, it ranges from northern Africa to the Arctic and from western Europe to Japan. In the New World, the greater number of species is found in the mountains of western United States, extending south into central Mexico, with relatively few species in the east. There is considerable diversity in the genus and the various characters that may be used by botanists and horticulturists in the task of classifying onions or alliums are here described in some detail.

The genus Allium was for a long time included as a member of the Lily family (Liliaceæ) but of recent years has been removed to the Amaryllis family (Amaryllidaceæ) by some botanists because the flowers are borne in a bracted umbel at the top of the scape (fig. 33A). It is distinguished from its close relatives by (1) the presence of a typical oniony odor in the leaves and bulb, by (2) the 6-parted perianth that has the 1-nerved segments free or only very shortly united (fig. 33B), and by (3) the membranous spathe usually divided into two or rarely more bracts that are always united at the base (fig. 33C).

The rootstock of Allium is usually a bulb, but there are several rootstock types that are scarcely to be called such (fig. 32A,B). In one group, here referred to as the Rhizirideum alliums, the rootstock is a stout (or less frequently slender) rhizome, bearing at its

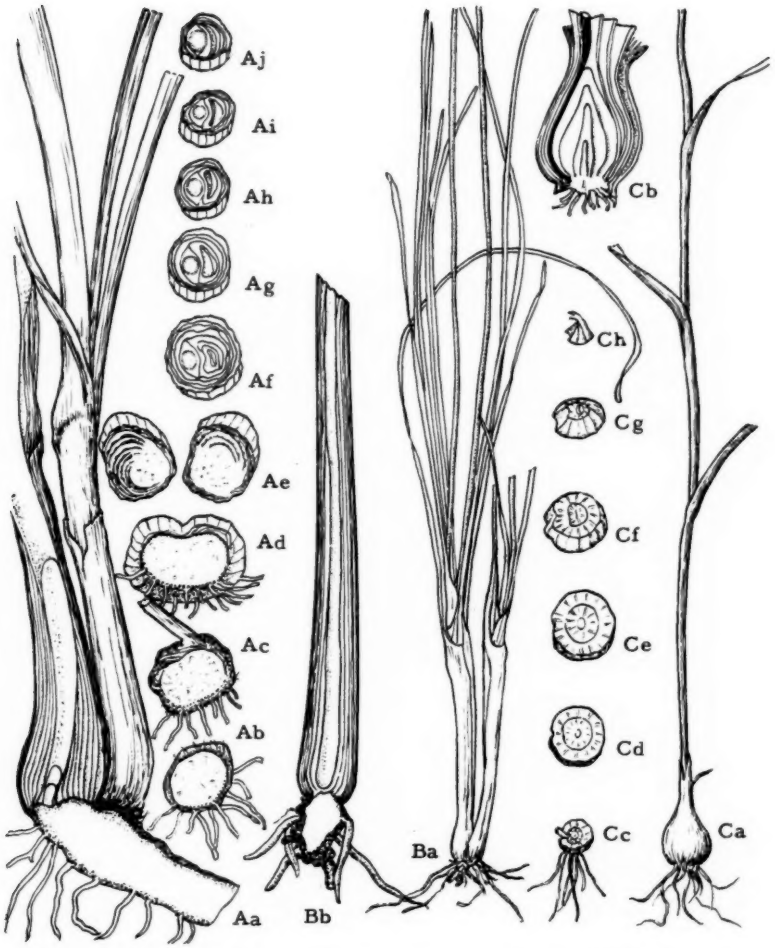


Fig. 32. A, Allium senescens: Aa, plant in vertical section x 2/3; Ab, Ac, Ad, Cross sections through rhizome; Ae, cross section through tip of rhizome; Af, Ag, Ah, Ai, Aj, cross sections through bulb x 2/3. B, Allium cyaneum: Ba, habit x 3/4; Bb, bulb and rhizome in vertical section x 2. C, Allium pulchellum: Ca, habit x1/2; Cb, bulb in vertical section x1; Cc, Cd, Ce, Cf, Cg, Ch, cross sections of bulb x1/2.

tip one or usually a pair or cluster of weakly developed bulbs that are merely enlarged bases of the current year's leaves. In the Rhizirideum alliums, the storage function is taken over by the rhizome, which sends up new shoots from its tip each year. This type of rootstock is illustrated in figures 32A and 32B. The more familiar rootstock is a true bulb, with enlarged fleshy bases of the leaves forming a food reserve. The bulbous type is often said to lack rhizomes, but in almost any species of onion a rhizome of some degree may be found. It is usually vertical or strongly inclined and is seldom so well developed as the horizontal rhizome of the Rhizirideum group. Very often it is not at all persistent and can be observed only as the short solid portion at the base of the bulb (fig. 32C).

In the bulb-producing types, the inner scales are ordinarily hard and thick, sometimes almost corm-like in their consistency. They are covered with several fibrous or membranous coats or tunics that are often very important in classification. The fibrous tunics may have the fibers parallel and closely appressed (fig. 33D), or very often are arranged to form a reticulate pattern through repeated forking of the strands (fig 33E). The membranous tunics may have widely spaced longitudinal parallel fibers that are not conspicuous and have between them broad expanses of thin papery cells (fig. 33F). Some membranous coats may be very thin at first and then become thickened and conspicuously marked or patterned with age (figs. 33 G, H, I, J). This patterning is especially well developed in many species of the western United States and in a group of species centered in the Mediterranean region of Europe and Asia Minor.

The leaves also are of major importance. They may be borne at the base where they leave the bulb at about the same level and often in a distichous or two-ranked fashion (fig. 32A), or they may clothe the stem high up in a succession of tubular sheaths, each with a blade at its summit (fig. 32C). The blades themselves may be flat (fig. 33K), keeled with a concave upper surface and triangular lower surface (fig. 33L), concave-convex with the upper surface concave, the lower rounded (fig. 33M), semi-cylindric (fig. 33N), filiform, or nearly hairlike or terete (fig. 33O), and either solid or hollow.

The scape is usually solid and round, less frequently hollow or flattened or triangular (figs. 33P, 33Q, 33R). The spathe varies from short to long. The Codonoprasum onions are distinguished by the very long-beaked spathe that much exceeds the umbel. In some of our American onions, the number of nerves in the spathe valves is of importance. In addition to the spathe, there are also very small membranous bractlets that often appear at the base of the pedicels. Although they, in themselves, offer no distinctive character, their presence or absence is sometimes important. The length of the pedicels, whether shorter than, equal to, or much longer than the flowers, and whether they are all of the same length or variable in length, is used to differentiate species in some groups.

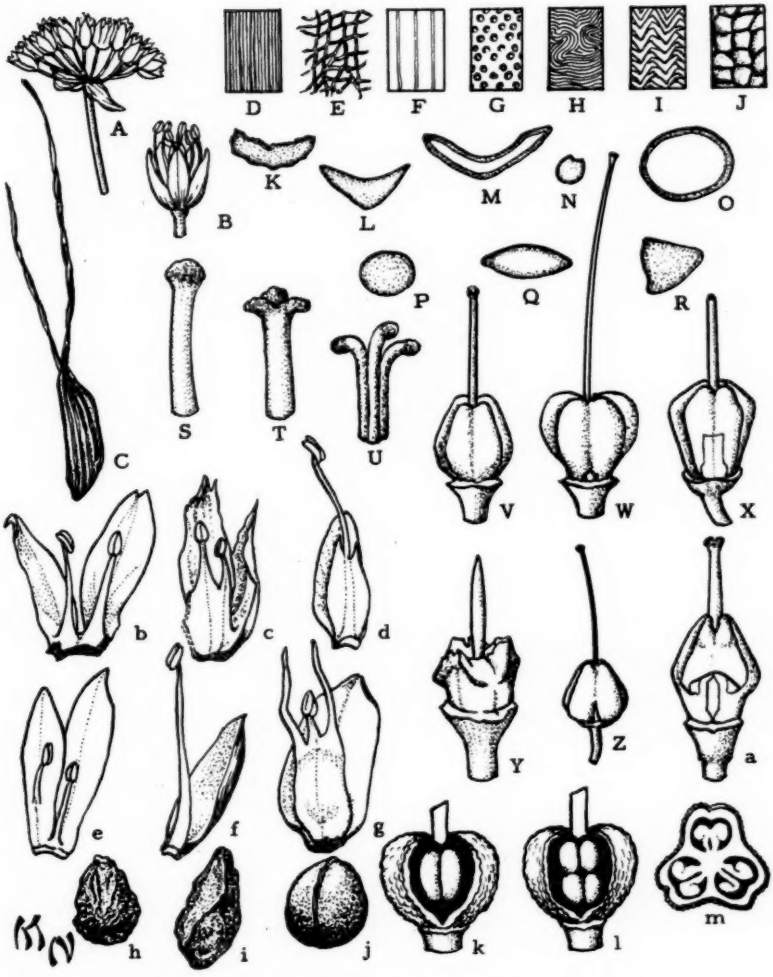


Fig. 33. Allium details: A, umbel, A. textile; B, flower, A. textile; C, spathe, A. pulchellum; D-J, portions of bulb-tunics much enlarged, D, A. ochroleucum; E, A. textile; F, A. cernuum; G, A. roseum; H, A. fibrillum; I, A. dichlamydeum; J, A. acuminatum; K-O, leaves in cross-section, K, A. pulchellum, L, A. Farreri; M, A. ramosum, N, A. flavescens, O, A. fistulosum; P-R, scapes in cross-section, P, A. rotundum, Q, A. senescens, R, A. triquetrum; S-U, stigmas, S, A. senescens, T, A. Farreri, U, A. triquetrum; V-Z, a, ovaries, V, A. ramosum, W, A. Schoenoprasum, X, A. cyaneum, Y, A. cernuum, Z, A. fistulosum, a, A. rotundum; b-g, stamens, b, A. ramosum, c, A. Farreri, d, A. nutans, e, A. triquetrum, f, A. pulchellum, g, A. rotundum; h-j, seeds, h, A. senescens, i, A. Schoenoprasum, j, A. tricoccum; k-l, ovaries with locule opened, k, A. senescens, l, A. Christophii; m, ovary in cross-section, A. Christophii.

It is in the flower that most of the specific differences are to be observed; in some instances differences that separate whole subdivisions. The perianth in its size and color, in its shape and persistence is extremely important. Even more so are the stamen-filaments whose characteristics are relatively constant within any given species but which differ considerably among species. They are usually inserted at the base of the perianth in a single line (fig. 33b), but are sometimes in two rows (fig. 33e). They may be entirely free and distinct (fig. 33f) or united with the corolla and with each other (fig. 33c). They may be entire (fig. 33f) or the base or apex may be broadened and toothed (figs. 33d, 33g). In length they may be shorter than to much longer than the perianth.

The ovary is always composed of three locules in each of which there may be from one to ten ovules in one or two ranks (fig 33k,l). The number of ovules is a constant feature so far as is known and is extremely useful in determining some of the subdivisions. The most common number is two per locule, very rarely one, and only infrequently three or more. The outside of the ovary is usually plain, but in some species bears from 3-6 ridges or crests at the summit. A slender style tipped with a capitate, entire, shortly 3-lobed, or deeply trifid stigma may be included within the flower or exserted beyond the perianth (figs. 33s, t, u).

One of the most important characters in the genus is to be found in the septs or hollows between the locules. In a whole series of species [The Schoenoprasum and the Alliotypus onions] a nectary is developed in this sept. This nectary is usually at the base but may extend halfway up the ovary wall in a number of shapes. It may be a shallow pit at the base (fig. 33W), a narrow slit (fig. 33Z), or a broad and much shouldered depression (fig. 33a,X), and sometimes is covered by a thin membrane or prominence. In living material nectaries are ordinarily visible at the time of flowering but are sometimes obscured in dried specimens. They are, however, almost always visible in fruiting condition, for the walls of the capsule retain the distinctive shape of the nectary. In those species lacking nectaries, there is sometimes a more deeply colored zone of the ovary but this is smooth and is not significant in fruit.

Lastly, the seeds themselves are sometimes useful. They are ordinarily black and rather angular (fig. 33h), but are sometimes very long, slender, and flat (fig. 33i), or much less frequently are nearly round (fig. 33j). In some species they are intricately patterned with a reticulation and sometimes pustuliferous or roughened with tiny prominences.

Various combinations of these characters have been used to break the genus Allium into subdivisions. In an article entitled, Notes on the Genus Allium in the Old World, Herbertia 1: 18-21 (1944) [1946], Stearn has given a synopsis of the history of these attempts. The present approach is not entirely in accord with any of these previous systems and no attempt is made to provide a for-

mal grouping of the alliums. The subdivisions adopted here are believed to be based on useful and reasonably easily observed characters that may be used by botanists and gardeners alike. The major groupings appear to be homogeneous in their broad outlines but undoubtedly some of them need further subdivision into less unwieldly units. In this and in future discussions an attempt will be made to correlate to some degree the groupings of species with names of sections used in the literature. The following key is more of a synopsis than a simple key, but it is only by observing several characters in combination that some of the species can satisfactorily be placed. The species of Group I are treated in this article. Those of the remaining groups will be considered in later articles.

1. Ovary without open nectaries in the septs (fig. 33V).
   2. Leaves with a lanceolate, oblong or broadly elliptic to ovate blade on a definite narrowed petiole; bulbs slender, elongate, seated on a stout to slender rhizome; seeds one per locule, spherical or nearly so (fig. 34). I. The Broad-leaved alliums
   2. Leaves filiform to linear or sometimes broader and subpetiolate but then the bulb ovoid to subglobose.
      3. Bulbs poorly developed, generally elongate and scarcely enlarged at the base, borne singly, in pairs or clustered on a stout, persistent horizontal rhizome or densely cæspitose on a more slender rhizome (figs. 32A, 32B); outer bulb-coats membranous with parallel fibers and soon disintegrating or fibrous-reticulate and more or less persistent, the inner core of the bulb neither thickened nor hardened; ovary never crested; ovules 2 per locule. II. The Rhizirideum alliums
      3. Bulbs generally well developed with an expanded basal portion below a narrower neck, solitary or clustered through division of the bulb or the production of axillary bulblets, seated on a short-lived to persistent, usually vertical or inclined rhizome or at the tips of vermicorm secondary lateral rhizomes (fig. 32C); outer bulb-coats usually more or less persistent, fibrous-reticulate, papery or coriaceous, less frequently thin and membranous but then the ovary crested, the inner core thickened and hard.
         4. Spathe strongly beaked, longer than the umbel; leaves successively sheathing, the scape sometimes to the middle (fig. 33C, 32C). III. The Codonoprason alliums

4. Spathe not strongly **beaked, not** exceeding the umbel; leaves mostly basal and divergent at the same level, rarely sheathing the scape in short succession (fig.32A).

5. Ovules 3-10 per locule (fig. 331).

IV. The Melanocrommyum alliums

5. Ovules 2 per locule (fig.33k). V. The Molium alliums

1. Ovary with open nectaries in the septs, the nectaries forming a pit or shouldered depression on the capsule (fig. 33W, X, Z, a).

6. Inner stamen-filaments entire or bidentate below the middle, more rarely bidentate at or above the middle but then the lateral teeth shorter than the central anther-bearing filaments (figs. 33f, 33d).

VI. The Schoenoprasum alliums

6. Inner stamen-filaments broadened, flat, trifid at the apex, the lateral teeth as long as or longer than the central anther-bearing filament (fig. 33g).

VII. The Alliotypus alliums

I. The Broad-leaved Onions

Three of the cultivated alliums are distinguished for the gardener by the character of their leaves and by their preference for woodland habitats. Although they are not necessarily closely related from the botanist's point of view, they are easily recognized because the leaves are expanded into a broad lanceolate to ovate blade from a narrow and distinct petiole (fig. 34). All three species are further distinguished by having very long, slender bulbs that are usually attached to a rhizome, varying in its stoutness and persistence. By the character of the bulb, they may be distinguished from a few species of the Molium alliums that tend to have rather broad blades, but are possessors of small but well-formed, distinctly egg-shaped or rounded bulbs with thickened membranous coats and generally much larger, more ornamental flowers.

Each of the 3 species discussed here is representative of a single section and in two instances they are the only species in a section. Allium ursinum is the only species in section Ophioscorodon (Wallroth) Endlicher. Allium tricoccum is the only representative of the Section Validallium (Small) Stearn, considered to be a distinct genus [Vallidallium] by Small in his Flora of the Southeastern United States and in his Manual of The Southeastern Flora. Allium Victorialis is one of perhaps 6 - 8 species native in Europe and Asia that belong in the Section Anguinum G. Don ex Koch. Readers familiar with the English translation of Hermann's key to the sections of Allium in Europe, Herbertia 12: 71-72 (1945) [1947], will find that other names have been used for two sections. Section Ophioscorodon is called Section Arktoprason, and Section Anguinum is called Section Nikeoprason. Neither of the new names can be maintained. Because he was dealing only with the European alliums Section Validallium was not mentioned.

Fig. 34. A, Allium ursinum, habit x1/3 and flower x1. B, A. tricoccum, habit at flowering and after flowering x1/3 with flower x2. C, A. Victorialis, habit x1/3 and flower x1.

The three species may be distinguished by the following key:

1. Perianth segments 9-12 mm. long, about twice as long as the stamen filaments; bulb coat membranous with a few long fibers, splitting longitudinally, the central core thickened and hardened; rhizomes slender or moderate, not long persistent; ovules two per locule. A. ursinum

1. Perianth segments 4-5 mm. long, equalled or exceeded by the stamens; bulb coats fibrous-reticulate, the central core not thickened nor hard; rhizome horizontal, stout, persistent.

   2. Lvs. appearing with the flowers, their bases sheathing the scape for 1/3 - 1/2 its length; stamen-filaments longer than the perianth; ovules 2 per locule. A. Victorialis

   2. Lvs. withering before the flowers appear, their bases not sheathing the scape; stamen-filaments about equalling the perianth; ovules 1 per locule. A. tricoccum

These species are useful for wild plantings or for the shaded border where they find an approximation of their natural conditions. Residents of the eastern United States may be familiar with Allium tricoccum Aiton (fig. 34B) in the wild. It is sometimes transplanted to the wild garden and at times behaves as a weed. In this species the leaves appear in early spring and wither before the flowering scapes appear. The illustration in fig. 34B, therefore, is somewhat more accurate than that which appears in Bailey's "Standard Cyclopedia of Horticulture," where a plant was illustrated with leaves and flowers at the same time.

In the wild state, Allium tricoccum consists of two or perhaps even more races that vary in minor details. For a note on these races see Rhodora 48: 61-63 (1946). One race occurs in moist soil and springy woods, flowering from a week to ten days earlier than the second race. The second race is a resident of upland woods and is a later flowering type with a green, rather than deep purple scape. The leaves are pale green and glaucous rather than bright green and shining. The second race has been given the name Allium tricoccum var. Burdickii Hanes, but it is not known to be cultivated as such. Core, Castanea 10: 110 (1945), notes that in the southern Appalachians Allium tricoccum is sometimes called Ramps by the inhabitants who have carried over to this species a variation of the name widely used for Allium ursinum in England. For a short period in the spring before the leaves are fully expanded, the bulbs are edible, providing occasion for "ramp-eating festivals" in the mountains of West Virginia.

Allium ursinum, Linnaeus (fig. 34A) commonly known as Ramsons in England and by variants of this name in other languages in Europe, is rather frequent throughout the British Isles and elsewhere in Europe from Scandinavia and Central Russia to the Mediterranean countries and Asia Minor. In spite of its resemblance to Allium tricoccum and Allium Victorialis it probably is quite different in its relationship. Because of its solid bulb-scales and its perianth, it appears to be more closely related to the Section Molium.

Allium ursinum is a food plant in the raw state and has been so known since at least the first century A. D. Its German name, Bärenlauch, is a translation of the Latin, which means Bear's Leek. The flowers of this species are larger than those of the other two and are a clear white. The perianth segments are very slender, resembling in this respect such species of Section Molium as Allium subhirsutum. The leaves are borne with the flowers in spring.

Our third species, Allium Victorialis Linnæus (fig. 34C) is a wide-spread, variable species that is yet to be fully understood over its entire range. Like Allium ursinum, the raw plants are used for food and it is said that the salted stalks are laid up in Siberia for consumption in the winter. It is called Cheremsha or Kolba in Russia and is said to possess anti-scorbutic properties. The species has smaller flowers than Allium ursinum and in many respects is probably much more closely related to Allium tricoccum.

STANDARDIZED PLANT NAMES

The above is the title of a revised edition of a bulletin received recently from the C. S. I. R. O. at Melbourne, Australia, a work not to be confused with the American horticultural book of the same name. Because of the identical titles, and the increasing interest in Australian plants, attention is here invited to this bulletin.

The Australian SPN is a list of standard common names for the more important Australian grasses, other pasture plants, and weeds. There are two indices, one of Latin names and one of the standard common names, and each is appropriately cross-indexed. Generally, one standard common name is provided for each species but in some instances recognition is given to more than one when one common name is well-established in one State and a different one in another.

Not only are botanical synonyms given in the index to Latin names, but all identifiable common names are given and are cross-referenced to the designated standard common name in the index to vernacular names.

†Standardized Plant Names. Bulletin no. 272, Commonwealth Scientific and Industrial Research Organization, Australia. 132 pages, Melbourne, 1953.

Indian Corn in Old America[1]

In a day when the economic problems of corn are the subject of widespread debate, it is refreshing to turn to an account dealing with this commidity on a different basis. Indian Corn in Old America by Dr. Paul Weatherwax, Professor of Botany at Indiana University is a comprehensive, readable, and handsomely illustrated book on "the corn plant and the system of agriculture and household arts based on it as they existed in Ancient America".

It would be difficult for the average grower or consumer of corn in the United States to imagine that Indian Corn or maize could have been so casually received and so little appreciated in the years immediately following Columbus' voyages. Its introduction to the Old World and its early history there are considered in discussions prefaced by a well-digested summary of the written record provided by the early chroniclers of life in the Americas.

For the general reader, chapters devoted to the cultivation and use of corn may well prove the most interesting portion of the book. The traveler in Latin America who has had an opportunity to sample some of the usual or unusual products of corn may or may not agree with the Italian, Benzoni, who wrote in 1565 that corn bread is not at all good when cold, and not very good hot or cold. Apart from bread, however, corn is the basis for numerous other dishes and beverages that still form the essential diet in many parts of the western hemisphere. Tamales in tins and popcorn in the theater lobby are a far cry from the products described in some detail by Dr. Weatherwax. Though the housewife may not relish the prospect of preparing a delicacy from corn smut, she may be surprised to find that it is a choice tidbit among Indians in our southwestern states and in Mexico. The connoisseur of corn whiskey may be startled by the process of fermention involved in the making of chicha, a beverage most popular in the Andes of South America.

Final chapters survey the complex, vexing, and intriguing problem of the origin of corn and the ways in which it was improved by the Indians. Botanists are not entirely in accord on the problem of origin but the various suggestions put forth by them have been considered with relative dispassion. If there appears to be an excess of technical terminology in these later chapters it may be attributed to the difficulty of explaining so complex a subject in the vernacular. Years devoted to the study of corn in its many ramifications have given Dr. Weatherwax a background of information from which he has written a fascinating portrayal of our most important truly American crop. A rather full bibliography is appended for the reader who wishes to pursue the subject further.

H. E. M.

[1]Weatherwax, Paul. "Indian Corn in Old America." 253 pp. The Macmillan Company, New York, 1954. $7.50.

David Fairchild [1869-1954]

H. E. Moore, Jr.

Scarcely a person in the United States remains untouched, knowingly or unknowingly, by the work of Dr. David Fairchild, a work that came to its close in Coconut Grove, Florida, on August 6th. He was organizer and Chief of, or Explorer for, what is now the Section of Plant Introduction, Agricultural Research Service, U. S. Department of Agriculture from 1898 to 1933. With his associates and successors, he has been responsible for the introduction of new crops that have revolutionized our agriculture. Russian wheat, Japanese rice, soybean, kudzu, Peruvian alfalfa and a host of other plants numbering over 200,000 introductions pay tribute to his vision.

The horticulturist, particularly in the south, is indebted to him for many ornamentals and tropical fruits. An early interest in Florida developed into an abiding love for the Miami region that was shared by Mrs. Fairchild. For many years their home, The Kampong, in Coconut Grove has served as a private supplement to the nearby Fairchild Tropical Garden, founded by his friend the late Colonel Robert H. Montgomery, and to the U. S. Plant Introduction Garden, early established by Dr. Fairchild. On the grounds of The Kampong, the Fairchilds have set out and watched a large number of unusual plants. Their infectious enthusiasm for these plants has won many a convert to such edible delicacies as the bael fruit, jaboticaba, loquat, mango and to numerous handsome ornamentals. Most favored among the latter were the palms for which Dr. Fairchild had a deep affection.

In the Bailey Hortorium copy of Dr. Fairchild's autobiographical book, The World Was My Garden, there is a handwritten inscription reading "To Professor L. H. Bailey who has watched me almost from babyhood and encouraged me through all the years." Perhaps destiny ordained that the boy who clung to Liberty Hyde Bailey's hand at Michigan State College should, like him, develop a deep love for all plants and an especial interest in the palms. While Dr. Bailey became engrossed in the classification of palms, Dr. Fairchild devoted his efforts to the introduction and dissemination of as many kinds as would stand the comparative rigors of Florida's climate.

On all too infrequent visits, it has been my great privilege to roam The Kampong with Dr. Fairchild. At each tree he would recall its history, discuss its name and note its progress. Luncheon conversations were always spiced, not only with the flavor of the

fruit of the season, but with the Fairchilds' recollections of their travels among Pacific Islands and with dreams of palms as yet unknown to us in the United States or even to science.

To a young man, these infusions of enthusiasm for tropical plants were augmented by exposure to Dr. Fairchild's keen appreciation of everything about him. Commenting one day on the current passion for bright color, he remarked how few people were aware of the infinite variation of green. Today I am continually impressed with the wisdom of that remark and a depth has been added to the study of living plants that once was lacking. The effect of his tremendous personal charm has been felt by all who have come in contact with him.

Much of this charm shows through in his writings. Exploring For Plants, Garden Islands of the Great East, The World Grows Round My Door and especially The World Was My Garden, recount vividly the record of his life and of his accomplishments. It would be futile to attempt an adequate recapitulation of the varied experiences so delightfully described in them.

Born into the intellectual world of a family of educators and reared on the campuses of Michigan State College and Kansas State College of Agriculture, he was constantly surrounded by stimulating people and ideas. After graduating from Kansas State College, he did further work at the University of Iowa and Rutgers. Graduate studies were interrupted in 1889 for the challenge offered in the Section of Plant Pathology at the Department of Agriculture in Washington, D. C. Except for periods of study in Italy, Germany and Java from 1893-1896, and a number of extensive periods of exploration sponsored by Mr. Barbour Lathrop, the Section of Plant Introduction and Mr. Allison Armour, Dr. Fairchild was associated with the Department until his retirement to the status of collaborator in 1933. In 1905 he married Marian Bell, daughter of Alexander Graham Bell. In succeeding years the Fairchilds reared a family of three children, now Dr. Graham Fairchild, Mrs. Leonard Muller and Mrs. Marston Bates.

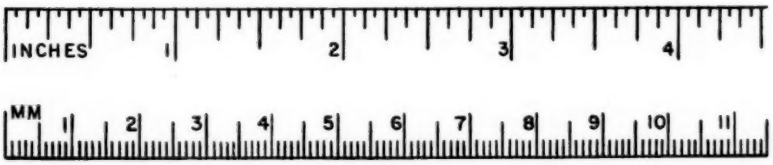
In 1939-1940 a lifetime dream of visiting the Molucca Islands was realized when Mrs. Anne Archbold sponsored an expedition on the Chinese Junk "Cheng Ho". From this expedition, interrupted by the onset of war, came the story of Garden Islands of the Great East and a wealth of plant material for the Fairchild Tropical Garden.

The last years have seen some of these plants from the Moluccas flower and fruit in Florida and the gratification of a dream became real indeed. These plants, growing in the garden that bears his name, and the increased productivity of our agricultural resources will remain a living tribute to a lifetime spent in seeking the best for his countrymen.

ABBREVIATIONS USED IN BAILEYA

[Excluding abbreviations of author's names following binomials etc.]

ann.	annual	dm.	decimeter	lf.	leaf
bien.	biennial	fl.	flower	lft.	leaflet
br.	branch	fls.	flowers	lvs.	leaves
brt.	branchlet	flt.	floret	mm.	millimeter
caps.	capsule	fr.	fruit	per.	perennial
cl.	clone	ft.	foot	segm.	segment
cm.	centimeter	hort.	horticultural	st.	stem
cv.	cultivar	in.	inch	sts.	stems
diam.	diameter	infl.	inflorescence	var.	variety

METRIC - ENGLISH EQUIVALENTS (approximate)

6 mm. - 1/4 in.	10 cm. - 4 in.	10 mm. - 1 cm.
12 mm. - 1/2 in.	1 dm. - 4 in.	10 cm. - 1 dm.
25 mm. - 1 in.	3 dm. - 1 ft.	10 dm. - 1 meter
2.5 cm. - 1 in.	10 dm. - 1 yd.	
5 cm. - 2 in.	1 m. - 39 in.